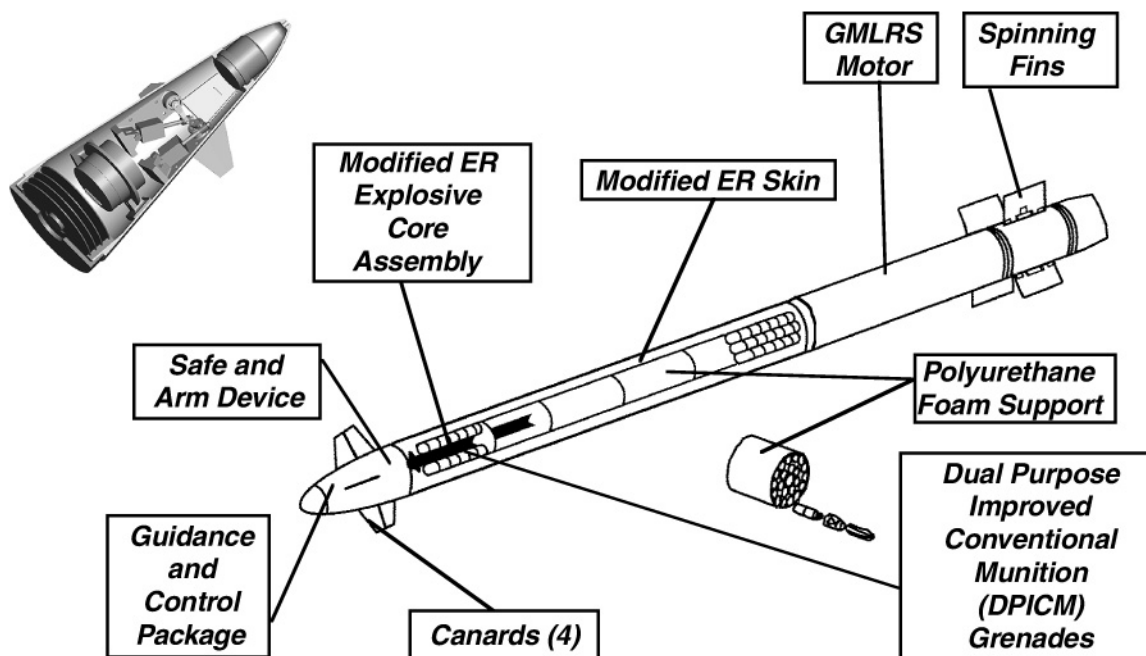


GUIDED MULTIPLE LAUNCH ROCKET SYSTEM (GMLRS) ROCKET



Army ACAT IC Program

Total Number of Systems	
(Army Procurement Objective):	83,922
Total Program Cost (TY):	\$3.6B
Average Unit Cost (TY):	\$43K
Ave Unit Procurement Cost (TY):	\$41K
Full-rate Production:	2QFY06
Low-rate Production:	3QFY03

Prime Contractor

Lockheed Martin Missile and Fire Control –
Dallas, TX

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Guided Multiple Launch Rocket System (GMLRS) rocket is an enhanced version of the current MLRS Extended Range (ER) rocket. The GMLRS rocket, like the ER and the basic M26 MLRS rocket, is designed to be used against soft and lightly armored stationary targets. The overall length and diameter have not changed. As with the current rockets, an MLRS launcher will carry twelve GMLRS rockets configured in two six-rocket Launch Pod Containers (LPC).

The GMLRS rocket has a range in excess of 60 kilometers, compared to the ER rocket's 45 kilometers. The ER rocket increased its range compared to the M26 rocket by reducing the bomblet load from 644 to 518 and increasing the amount of propellant. Range for the GMLRS rocket is further extended by changing the rocket motor design to increase burn time and total motor impulse. The number of bomblets will be reduced from 518 to about 400.

The GMLRS rocket includes a Global Positioning System (GPS)-aided inertial guidance and control unit, intended to produce accuracy of 2 to 3 mils with inertial-only guidance and less than 15 meters circular error probable (CEP) with GPS.

The ER and GMLRS rockets were intended to carry a modified bomblet to reduce the number of hazardous duds on the battlefield. The basic M26 rocket carries Dual Purpose Improved Conventional Munition (DPICM) M-77 bomblets. The modified ER and GMLRS bomblet, the M-85, had the same bomblet body but had a redundant fuzing system with the addition of an electronic self-destruct device. The modifications were not expected to affect the bomblet's lethality. As explained in the Assessment section below, producibility problems have led to a search for other self-destruct designs.

The GMLRS rocket provides commanders an operational fires capability for *precision engagement* of the enemy throughout the depth of the battlefield beyond the range of the currently fielded cannons and rockets. The targets include soft and lightly armored combat vehicles, multiple rocket launchers, towed artillery, air defense units, and command/control/communications sites. The ER and GMLRS rockets' ability to engage the enemy at extended ranges supports the *Joint Vision 2020 dominant maneuver* force by helping the commander shape the battlespace.

BACKGROUND INFORMATION

The need for the ER and GMLRS rockets is based on the experiences of Operation Desert Storm and the continued threat of the proliferation of longer-range artillery systems. ER-MLRS is an ACAT III program, and GMLRS development through LRIP is an ACAT II program. Both are included in the MLRS Upgrade, an ACAT IC program.

An Acquisition Program Baseline (APB) was approved in March 1998 that restructured the MLRS rocket programs. Under this plan, there was to be no Milestone III full-rate production decision in the ER program. LRIP of the ER rocket was to continue until FY00, and GMLRS was expected to be cut into production starting in FY02. Approximately 4,000 of the ER rockets were fielded to provide an interim capability to U.S. Forces, Korea. These rockets were fielded with the M77 DPICM bomblet because of difficulties developing the self-destruct fuze.

The GMLRS program is now being restructured because of breaches in schedule and cost. The draft revised schedule shows the GMLRS full-rate production decision in mid-FY06, almost two years later than in the original APB. The LRIP decision slips about 16 months.

GMLRS is an international program with France, Germany, Italy, and the United Kingdom. GMLRS was an Advanced Technology Demonstration program (ATD) starting in 1994.

TEST & EVALUATION ACTIVITY

The principal developmental test activity in FY00 was the Design Verification Test (DVT) of nearly 20 areas of engineering design, including bearing friction and temperature, fin load, tail section stiffness, forward cover release, and rocket structure and bending. Six static firings of the rocket motor propellant were conducted. There was major activity in software development and construction of a hardware-in-the-loop facility. The program is also experimenting with different types of Center-Core-

Bursters (CCB), which expel the bomblets from the rocket. The various CCBs produce different bomblet pattern sizes, which must be evaluated for their impact on munition effectiveness.

The GMLRS program has completed its five-flight ATD program. These ATD flights were to demonstrate a guidance and control package that is capable of achieving a 4-mil accuracy with inertial-only guidance, and a 30-meter CEP with GPS-aided inertial guidance. Accuracy of the two inertial-only ATD flights was 1.8 and 12 mils, respectively. Accuracy of the two GPS-aided flights was 140 meters and 2.1 meters, respectively. The fifth ATD rocket had a catastrophic launch failure. The first flight tests of GMLRS prototypes are scheduled to begin in 1QFY02.

GMLRS IOT&E is scheduled for FY05 and will include the firing of 24 rockets against a towed artillery battery with surrogate personnel targets. The rockets will be fired in operationally realistic, multiple-rocket ripple missions as requested by DOT&E. Modeling will be used to relate observed test results to effectiveness requirements against the other targets in the MLRS requirements document. The IOT&E will also include a ground phase to demonstrate the command and control capabilities necessary for the effective employment of the overall GMLRS system.

TEST & EVALUATION ASSESSMENT

The GMLRS TEMP, approved by DOT&E in March 1998, has a rigorous T&E program that takes advantage of modeling and simulation to evaluate targets and conditions not tested in IOT&E. Live Fire T&E will use data from IOT&E firings against a towed artillery battery target supplemented by existing M77 data. For the first time in a fire support program, the TEMP includes targeting and command and control in a Critical Operational Issue (COI). This should highlight the importance of end-to-end system evaluation.

As noted above, the program is being restructured. A primary cause of the breach in cost and schedule has been the poor performance of the GPS-aided inertial navigation unit. The prime contractor has terminated this contract and awarded the work to the other guidance system contractor that participated in the ATD program.

Another problem the GMLRS program faces is the difficulty in obtaining a self-destruct fuze for the submunitions. The program planned to use an M235 electro-mechanical self-destruct fuze; however, problems with cost and high-rate producibility of the fuze resulted in termination of the LRIP fuze contract and an anticipated delay of two or more years. The program manager is experimenting with minor changes to the original M77 bomblet that might get the hazardous dud rate down to an acceptable level for limited U.S production. The international partners require a self-destruct fuze. The program office will explore options for an alternative self-destruct fuze and, if successful, the new bomblet will then be tested and cut in to the production line.

The TEMP is being updated to incorporate changes from the restructured program. DOT&E is encouraging the Army to include in the TEMP a plan to conduct test firings in a cold weather environment such as Ft. Greely, AK, and a plan to demonstrate interoperability with the HIMARS launcher. DOT&E is also encouraging closer coordination between the GMLRS program and the programs for the intended primary targeting sensors, such as the Q-47 Firefinder radar, whose target location error (TLE) is much larger than the expected accuracy of GMLRS.

LESSONS LEARNED

Early DOT&E involvement in the GMLRS program at the request of the User and the Program Office helped shape the development of the ORD and COICs. This will provide better linkage from T&E to the key user requirements and help ensure an end-to-end evaluation of the total system. Also, the planned use of lethality data from the IOT firings against towed artillery targets is a cost-effective means to provide Live Fire data gathered under realistic engagement conditions.